

CLAIMS

1. A robust watermelon variety producing fruit with altered sugar ratios selected from at least one of elevated fructose and elevated sucrose content, having equal or reduced total sugar content, being devoid of bitterness and having superior sweet taste characteristics compared to currently available varieties, suitable for commercial scale cultivation.
2. The watermelon variety of claim 1 wherein the average fructose content is at least 50% of the total soluble sugar.
3. The watermelon variety of claim 1 wherein the average fructose content is at least 55% of the total soluble sugar.
4. The watermelon variety of claim 1 wherein the average fructose content is at least 60% of the total soluble sugar.
5. The watermelon variety of claim 1 wherein the average sucrose content is at least 65% of the total soluble sugar.
6. The watermelon variety of claim 1 wherein the average sucrose content is at least 70% of the total soluble sugar.
7. The watermelon variety of claim 1 wherein the average sucrose content is at least 75% of the total soluble sugar.
8. The watermelon variety of claim 1 wherein the average combined content of fructose and sucrose is at least 90% of the total soluble sugar.
9. The watermelon variety of claim 1 wherein the average combined content of fructose and sucrose is at least 95% of the total soluble sugar.
10. The variety of claim 1, wherein the variety is an inbred parent line.
11. The variety of claim 1, wherein the variety is a hybrid.
12. A watermelon fruit with altered sugar ratios selected from at least one of elevated fructose and elevated sucrose content, having equal or reduced total sugar content, being devoid of bitterness and having superior sweet taste characteristics compared to currently available varieties.
13. The watermelon fruit of claim 12 wherein the average fructose content is at least 50% of the total soluble sugar.

14. The watermelon fruit of claim 12 wherein the average fructose content is at least 55% of the total soluble sugar.
15. The watermelon fruit of claim 12 wherein the average fructose content is at least 60% of the total soluble sugar.
- 5 16. The watermelon fruit of claim 12 wherein the average sucrose content is at least 70% of the total soluble sugar.
17. The watermelon fruit of claim 12 wherein the average sucrose content is at least 75% of the total soluble sugar.
18. The watermelon fruit of claim 12 wherein the average content of fructose and sucrose is at least 90% of the total soluble sugar.
- 10 19. The watermelon fruit of claim 12 wherein the average content of fructose and sucrose is at least 95% of the total soluble sugar.
20. A seed of a robust watermelon variety wherein a plant grown from the seed produce fruit with altered sugar ratios selected from at least one of elevated fructose and elevated sucrose content, having equal or reduced total sugar content, being devoid of bitterness and having superior sweet taste characteristics compared to currently available varieties, suitable for commercial scale cultivation.
- 15 21. The seed of claim 20 wherein the average fructose content of the fruit is at least 50% of the total soluble sugar.
- 20 22. The seed of claim 20 wherein the average fructose content of the fruit is at least 55% of the total soluble sugar.
23. The seed of claim 20 wherein the average fructose content of the fruit is at least 60% of the total soluble sugar.
- 25 24. The seed of claim 20 wherein the average sucrose content of the fruit is at least 70% of the total soluble sugar.
25. The seed of claim 20 wherein the average sucrose content of the fruit is at least 75% of the total soluble sugar.
- 30 26. The seed of claim 20 wherein the average content of fructose and sucrose of the fruit is at least 90% of the total soluble sugar.

27. The seed of claim 20 wherein the average content of fructose and sucrose of the fruit is at least 95% of the total soluble sugar.
28. The seeds of claim 20 wherein the variety is an inbred parent line.
29. The seed of claim 20 wherein the variety is a hybrid.
- 5 30. A watermelon plant, or part thereof, produced by growing the seed of any one of claims 20-29.
31. Pollen of the plant of claim 30.
32. An ovule of the plant of claim 30.
- 10 33. The plant of claim 30 further comprising at least one additional trait selected from the group consisting of herbicide resistance, insect resistance, resistance to bacterial, fungal or viral disease, male sterility and improved nutritional value.
- 15 34. The plant of claim 33 further comprising at least one additional trait selected from at least one type of disease resistance and at least one type of stress resistance.
35. The plant of any one of claims 33 wherein the additional trait is introduced by breeding.
36. The plant of claim 35 wherein the trait is introduced by single trait conversion.
- 20 37. The plant of claim 33 wherein the trait is introduced by transformation.
38. The plant, or part thereof, of claim 37, wherein the plant or parts thereof have been transformed so that its genomic material contains one or more transgenes operably linked to one or more regulatory elements.
- 25 39. A tissue culture of regenerable cells of a watermelon plant, or part thereof, of claim 30.
40. A tissue culture according to claim 39, comprising cells or protoplasts from a tissue selected from the group consisting of leaves, pollen, embryos, roots, root tips, anthers, flowers, fruit and seeds.
41. The tissue culture of regenerable cells of claim 39, wherein the tissue

regenerates plants produces fruit with altered sugar ratios selected from at least one of elevated fructose and elevated sucrose content, having equal or reduced total sugar content, being devoid of bitterness and having superior sweet taste characteristics compared to currently available varieties, suitable for commercial scale cultivation.

42. A watermelon plant regenerated from the tissue culture of claim 39.

43. A method for breeding watermelon plant producing fruit with altered sugar ratios selected from at least one of elevated fructose and elevated sucrose content, having equal or reduced total sugar content, being devoid of bitterness and having superior sweet taste characteristics compared to currently available varieties and suitable for commercial scale cultivation, comprising the steps of:

- a. crossing at least one wild type *Citrulus* species with a *Citrulus lanatus* to produce F₁ hybrid seeds;
- b. collecting the hybrid F₁ seeds;
- c. growing plants from the F₁ seeds;
- d. pollinating the F₁ plants;
- e. collecting the hybrid seeds produced by the F₁ plants;
- f. growing plants from the seeds produced by the F₁ plants
- g. measuring the total soluble sugar content of ripe fruit produced from the plants grown from the seeds of the F₁ plants; and
- h. selecting plants with watermelon fruit comprising an average fructose content of at least 50%; or sucrose content of at least 65%; or fructose and sucrose content of least 90% of the total soluble sugar being devoid of the bitterness of the wild type *Citrulus* species.

44. The method of claim 43, wherein the pollination in step (d) includes self pollination.

45. The method of claim 43, wherein the pollination in step (d) includes back crossing with a *C. lanatus* plant.

46. The method of claim 43 wherein the steps of crossing and selecting are

repeated at least once.

47. The method of claim 43 further comprising the step of selfing, at least once, the selected plants, and further selecting plants producing fruit comprising an average fructose content of at least 50%; or sucrose content of at least 65%; or fructose and sucrose content of at least 90% of the total soluble sugar being devoid of the bitterness of the wild type *Citrulus*, to obtain super sweet watermelon advanced lines.

48. The method of claim 47 further comprising the steps of:

- a. crossing a *Citrulus* advanced line plant with a *C. lanatus* plant;
- b. selecting plants with watermelon fruits comprising an average fructose content of at least 50%; or sucrose content of at least 65%; or fructose and sucrose content of at least 90% of the total soluble sugar; and
- c. selfing the selected plants at least once to obtain inbred line producing fruit with altered sugar ratios selected from at least one of elevated fructose and elevated sucrose content, having equal or reduced total sugar content, being devoid of bitterness and having superior sweet taste characteristics compared to currently available varieties and suitable for commercial scale cultivation.

49. The method of claim 48 wherein selfing is repeated 1 to 12 times.

50. A method for producing first generation hybrid seeds comprising crossing a first parent watermelon plant with a second parent watermelon plant and harvesting the resultant hybrid F₁ seeds, wherein the first and the second parent plants are inbred lines producing fruits with altered sugar ratios selected from at least one of elevated fructose and elevated sucrose content, having equal or reduced total sugar content, being devoid of bitterness and having superior sweet taste characteristics compared to currently available varieties, suitable for commercial scale cultivation.

51. A hybrid watermelon seed produced by the method of claim 50.

52. A hybrid watermelon plant, or parts thereof, produced by growing the seed of claim 51.

53. A method for producing a watermelon plant derived from a plant according to claim 30, comprising:

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- a. crossing a first watermelon plant line with a second watermelon plant to obtain F_1 progeny seed, wherein the first watermelon plant is a plant according to claim 16;
 - b. growing the F_1 progeny seed under suitable plant growth conditions to yield an F_1 watermelon plant of the first hybrid plant; optionally
 - c. crossing the plant obtained in step (b) with itself or with a third watermelon plant to yield second progeny seeds derived from said first hybrid plant; and
 - d. growing the second progeny seed under suitable plant growth conditions to yield additional watermelon plant derived of said first hybrid plant.

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54. The method of claim 42 further comprising the step of repeating the steps of crossing and growing from 1 to 7 or more times to generate further watermelon plants derived from the plant according to claim 16.

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